

PATENT SPECIFICATION



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COMPLETE SPECIFICATION

Improvements in Fastening Devices

(A communication from ALBERT HENRY TINNEMAN, a citizen of the United States of America, of 10202, Edgewater Drive, Cleveland, Ohio, United States of America.)

I, WILLIAM JOHN TENNANT, a British Subject, of 111/112, Hatton Garden, London, E.C.1, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to fastening devices and particularly to a device for holding a nut firmly in position for receiving a threaded bolt. There are many instances, especially in blind locations where a standard nut is desired, but where the operator either cannot hold it in place while the bolt is being inserted or cannot thereafter hold it against rotation during the final tightening operation.

An effort has been made to retain a nut in bolt receiving position by welding it to one of the parts, but such method is not only expensive, but is objectionable in that the nut cannot be moved a slight distance to compensate for misalignment of the openings in the two parts that are to be connected together.

An object of the present invention is to make a fastener which can be readily attached to one of the parts to be joined and which will be so formed that it will hold the nut firmly in bolt receiving position. The attachment may take any one of several different forms, but in each case it comprises a clip which is frictionally held by spring tension onto one of the parts, and in each case, has provision thereon for holding a nut against rotation.

According to the present invention therefore a device for holding a nut in bolt receiving position upon one of two parts to be joined together comprises a strip of metal that is formed to engage opposite sides of the nut, characterized in that the metal strip holds the nut by spring tension and is itself formed to engage one of the parts and to be held attached thereto by spring tension.

In the accompanying drawings, Figs.

1, 2, 3 and 4 are perspective view of different forms which the fastening device may have, while Figs. 5, 6, 7 and 8 are vertical sections taken through the devices shown in Figs. 1 to 4 respectively, each fastener being shown in the latter group in connection with a bolt nut and two parts to be joined together. Figs. 9 to 14 inclusive, are perspective views of fastening devices embodying modifications of the invention; Fig. 15 is a vertical section taken longitudinally through the mid-portion of the device that is shown in Fig. 14 and Fig. 16 is a cross-section through a nut and article embodying a fastener such as that shown, for example in Fig. 11.

Each of the fasteners which are illustrated in Figs. 1, 2 and 3 comprises a clip that is formed from a flat sheet-metal strip that is bent upon itself to make a lower arm 10 and an upper arm 11, the two arms being spaced apart a sufficient distance to admit one of the parts to be joined, which is indicated for example at 12. The clip is so formed that the arms must be spread apart slightly to admit the article 12, wherefore the normal tendency of the arms to approach each other will hold the fastener by spring tension upon the article. One of the arms of clip, preferably the upper arm has provision thereon for yieldably holding a standard nut indicated at 15.

In Fig. 1, the nut retaining means comprises a channel-shaped holder, which is formed from the arm 11 and which has vertical walls 16 and 17, and a connecting web 18. The channel opens downwardly and has a bolt receiving opening 19, the diameter of which is larger than the outside diameter of the bolt thread so as to clear it when the bolt is inserted in the normal way. Similarly, the bottom layer 10 has a bolt receiving opening 20 in registration with the opening 19, and of sufficient size to clear the thread on the bolt.

Where the bolt opening 21 in the article 12 can be located near the marginal edge of the article, then the clip is so made that the shoulder 22 which is formed at the junction of the arms 10 and

11, engages the marginal edge of the piece at the time the openings 19 and 20 are in registration with the opening 21. Where the opening 21, however, is not close to a marginal edge, then a slot 23 is made in the article, through which the arm 10 may be inserted, after the nut 15 has first been positioned between the walls of the channel shaped retainer. It will be understood that the slot 23 is spaced sufficiently far from the opening 21 to cause substantial alignment between the axis of the opening in the nut, and that of the opening 21 when the bent portion 22 of the clip is positioned within the slot. It is also to be understood that the slot is sufficiently wide to allow a slight adjustment of the nut to compensate for any misalignment that may occur in production between the opening 12 and the opening 25 in the part 26.

The fastener which is shown in Fig. 2 is somewhat similar to that shown in Fig. 1 except for the fact that the retaining means for the nut comprises two upstanding walls 30 and 31, each of which has an upturned flange 32. The wall 30 may be bent upwardly from the end of the arm 11, while the wall 31 may be bent upwardly from the body portion of the arm 11, the distance between the walls being slightly less than the width of the nut, whereby the nut will be held therein by spring tension. In this illustration, the arm 11 has a bolt receiving opening 19 in registration with the corresponding opening 20 in the arm 10.

In the modification of Fig. 3, the free end of the arm 11 is bifurcated, and the nut has slots 35 on its opposing faces into which the forked ends of the arm 11 extend. The slots and forked ends of the arm 11 have a snug-interfitting relationship by means of which the nut is held by spring tension in bolt receiving position. In this modification, the lower arm 10 has a bolt receiving opening 20 in alignment with the opening in the nut.

In Fig. 4, there is shown a further modification in which the fastener is made of a strip of wire that is bent upon itself to provide a lower arm 10 and an upper arm 11. The free end of the upper arm is bent around the nut and is fitted into notches 40 on the vertical edges of the nut. Similarly the lower arm is bent to provide a bolt receiving opening and to assure a flat bearing surface against the under side of the article to which it is attached. It is to be understood that the fastener of Fig. 4 is so formed that the nut encircling portion 41 is smaller than the nut. Consequently, the encircling portion must be opened slightly to admit the nut, after which the spring tension in

the wire holds the nut firmly in place.

In the modification of Fig. 9, the fastener comprises a body of sheet metal which is indicated at 50 and which preferably is arched upwardly from end to end. The midportion of the body has a bolt receiving opening 51 in registration with the bolt opening in a nut 52. The nut retaining means comprise tongues 53, each of which is struck upwardly from the body and each of which has an upturned flange 54 adjacent the upper end thereof. The tongues are sufficiently close to exert spring pressure upon the side walls of the nut, so as to hold it securely in place. If desired, an additional tongue 55 may be struck upwardly from the body for engaging the side of the nut that is disposed at right angles to the faces which engage the tongues 53. The end of the tongue 55 acts, therefore, as an abutment to limit the movement of the nut during the inserting operation, so as to effect automatically registration of the opening 51 in the body with the bolt opening in the nut. The body also has tabs 56 extending downwardly and inwardly adjacent the ends thereof for engaging spaced openings in the article and for positioning the fastener in the desired location with reference to the article. Such openings are indicated, for example at 57 in the article 58 as shown in Fig. 16.

The fastener of Fig. 10 has preferably an arched body 50 that corresponds to that shown in Fig. 9, but the nut is held in place by spring tension that is exerted against the walls of slots 60 which extend along opposite faces of the nut. To position the nut on the fastener, the body of the fastener has an opening 61 therein which is larger than the overall dimensions of the nut, and the opening has a reduced portion which provides guideways 62 upon which the nut is supported. This fastener also has article engaging tabs 56 at the ends thereof, by means of which the fastener may be held against the article.

The modification of Fig. 11 is made of wire instead of strip stock. The wire is bent to provide two arms 65 which extend outwardly from the nut and which have article engaging portions 66 that are bent downwardly adjacent the ends thereof. The mid-portion of the fastener is curved as at 67, to clear the bolt opening in the nut, and to engage the top face of the nut. Moreover, the portion between the curved part and each arm 65 is bent laterally as at 68, and thence downwardly as at 69 to engage grooves in the top and opposite side faces in the nut. The bent portions 68, 69 are sufficiently close that they

exert a yieldable pressure against the faces of the nut so as to hold the nut in position solely by spring tension.

The modification of Fig. 12 includes a wire fastener, the mid-portion of which is bent as at 67 to clear the bolt opening in the nut, in the same manner as the fastener shown in Fig. 11. Similarly the fastener extends outwardly as at 68, and downwardly as at 69, to engage slots in the top and side walls of the nut. Starting at the lower end of the portion 69 each arm of the fastener is bent downwardly and inwardly as at 70, and thence outwardly as at 71, to provide hookshaped ends that are adapted to engage the walls of the bolt opening in an article. Such an opening is indicated, for example, at 72 in the article 73 of Fig. 15.

The modification of Fig. 13 is similar to that shown in Fig. 12 except for the fact that the wire fastener is shaped to engage parallel grooves 75 in the top face of the nut and parallel grooves 76 in the opposite side faces of the nut. One piece of wire is used to form the entire fastener and it is so shaped that the intermediate portion 77 and the ends 78 provide the yieldable hooks which engage the walls of the bolt opening in the article.

The fastener of Fig. 14 is preferably made from flat stock, which has a bolt receiving opening 80 in the mid-portion thereof and which has intermediate portions bent downwardly as at 81 to engage opposite vertical faces of the nut and thence inwardly as at 82 and outwardly as at 83 to produce tongues which engage the walls of a bolt opening in the article as shown at 72 in Fig. 15. If desired, the body may have an ear 84 extending downwardly therefrom for engaging a vertical face which extends at right angles to those faces that contact the arms 81.

From the foregoing description, it will be apparent that there has been devised a fastener that can be economically made and that will operate in a satisfactory manner to position a standard nut in place for receiving a threaded bolt. It will also be apparent that the fastener not only holds the nut in bolt receiving position but also holds it against rotation during the tightening operation.

Having now particularly described and ascertained the nature of the said invention and in what manner the same is to be performed, as communicated to me by my foreign correspondent, I declare that what I claim is:—

1. A device for holding a nut in bolt receiving position upon one of two parts to be joined together, comprising a strip of metal that is formed to engage opposite

sides of the nut, characterized in that the metal strip holds the nut by spring tension and is itself formed to engage one of the parts and to be held attached thereto by spring tension.

2. A device according to claim 1 characterized in that the strip is bent intermediately to provide two arms forming a clip which may be attached to one of the two parts to be joined together.

3. A device according to claims 1 and 2 wherein the nut engaging portion has a bolt receiving opening therein and has a pair of ears formed integrally therewith and disposed on opposite sides of the opening, the ears being substantially parallel to each other and being adapted to engage the opposite sides of the nut for holding it in bolt receiving position.

4. A device according to claims 1 and 2 wherein the nut engaging arm has a slot therein, the walls of which enter guideways in opposite faces of the nut.

5. A device according to claims 1 and 2 wherein the nut engaging portion comprises a strip of wire which encircles the nut for holding it in bolt receiving position, and wherein the other arm has an encircling formation which provides a bolt receiving aperture in registration with the opening in the nut.

6. A device according to claim 1, wherein the strip is formed with flexible tabs adjacent the ends thereof which are adapted to engage the support and thereby hold the strip in bolt receiving position thereon.

7. A device according to claims 1 and 6 wherein the strip has portions struck therefrom for engaging the nut on four faces thereof.

8. A device according to claims 1 and 6 wherein the strip has an opening large enough to receive the nut and has portions thereof communicating with the opening for engaging guideways in opposite faces of the nut.

9. A device according to claims 1 and 6 wherein the strip comprises wire that is curved at its central portion to extend around the opening in the nut.

10. A device according to claims 1 and 6 wherein the strip is made from stock in ribbon form and is bent to engage the top and two sides of a nut and wherein the top has an opening in registration with the opening in the nut.

11. A fastening device substantially as described.

Dated this 6th day of April, 1939.

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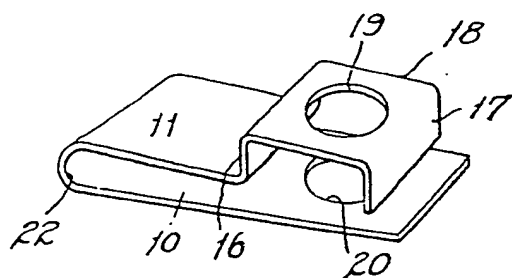


Fig. 1

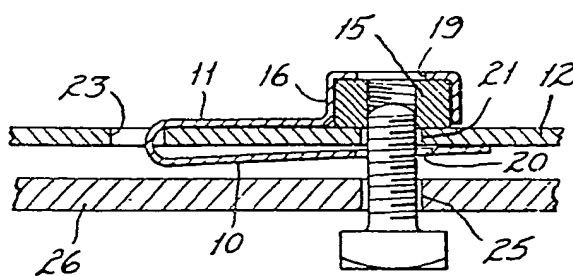


Fig. 5

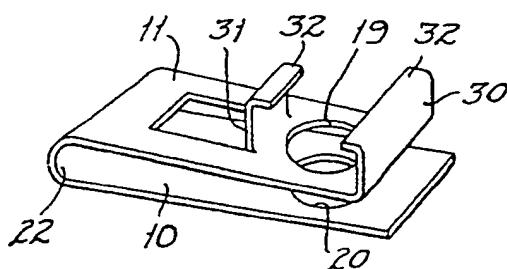
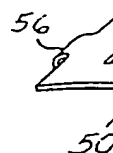


Fig. 2

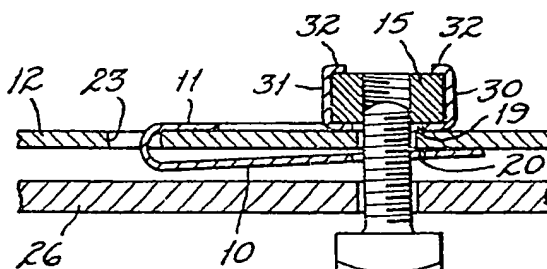


Fig. 6

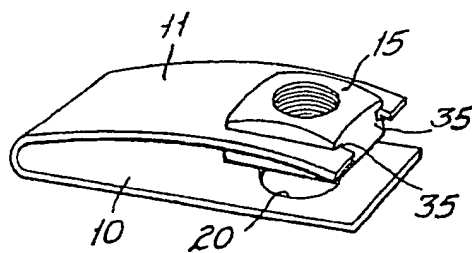


Fig. 3

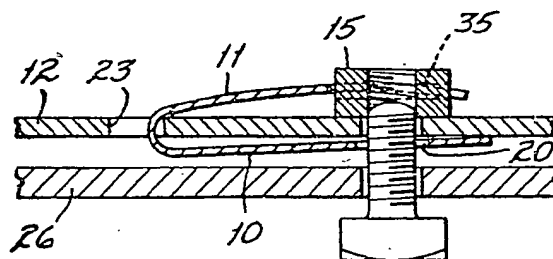


Fig. 7

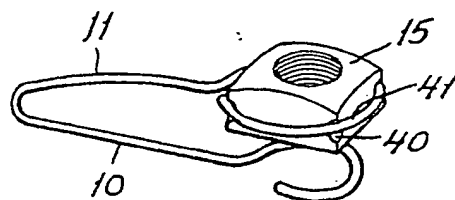


Fig. 4

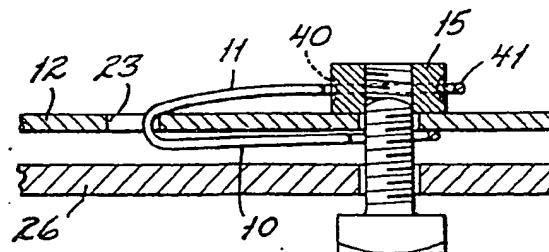


Fig. 8

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SHEET 1

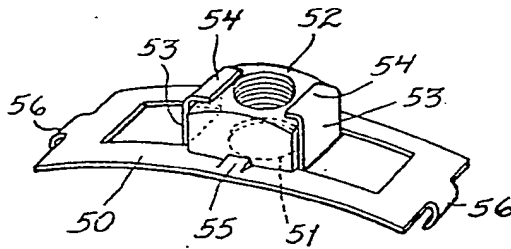
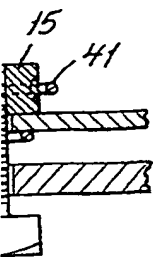
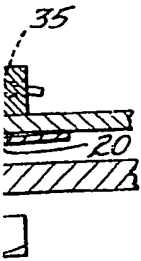
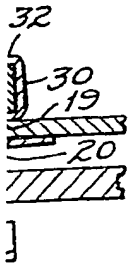
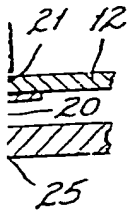


Fig. 9

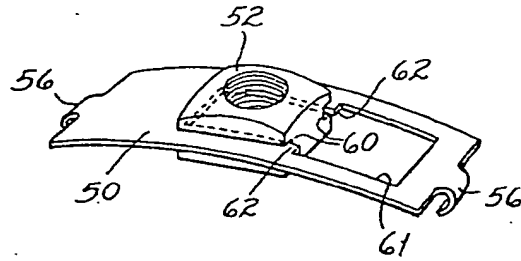


Fig. 10

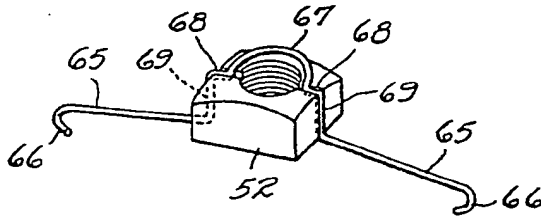


Fig. 11

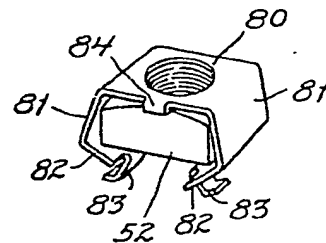


Fig. 14

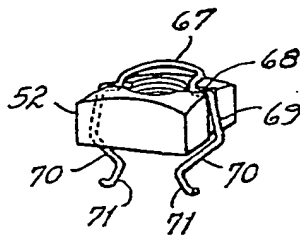


Fig. 12

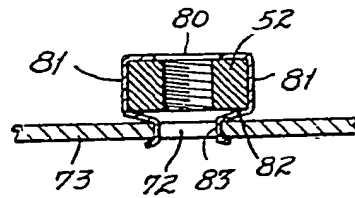


Fig. 15

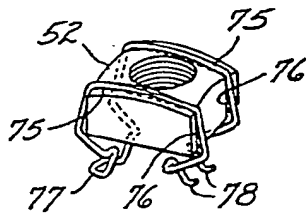


Fig. 13

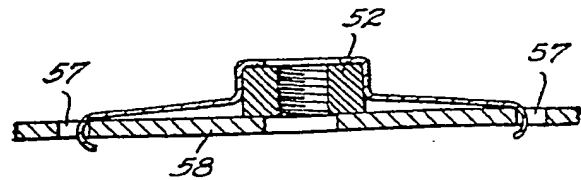


Fig. 16

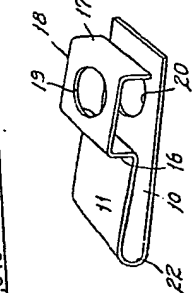


Fig. 1

Fig. 5

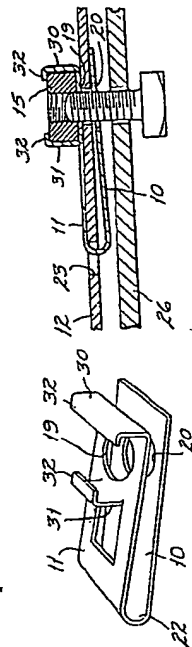


Fig. 2

Fig. 6

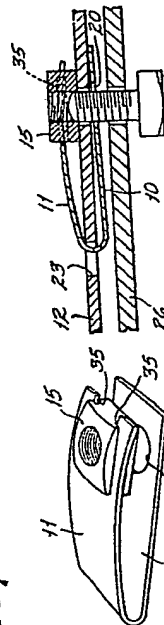


Fig. 3

Fig. 7



Fig. 4

Fig. 8

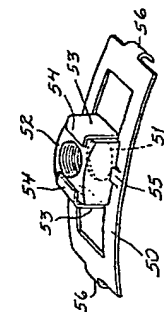
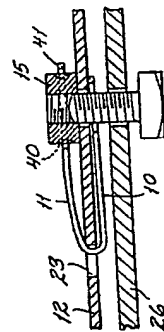


Fig. 9

Fig. 10

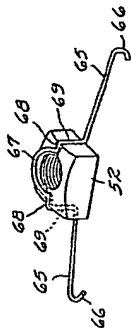


Fig. 11

Fig. 14

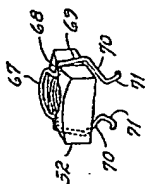


Fig. 12

Fig. 15

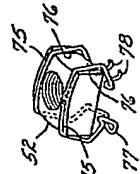


Fig. 13

Fig. 16



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